DOCUMENT RESUME

ED 319 497 PS 018 779

AUTHOR Rosales, Rebecca
TITLE Critical Thinking: Toward Intellectual Accountability and Social Responsibility. A Research Project on Critical Thinking, Cooperative Learning and Moral Development.
PUB DATE May 90
NOTE 46p.; Master's Thesis, Dominican College.
PUB TYPE Dissertations/Theses - Master Theses (042) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Classroom Research; Cooperative Learning; *Critical Thinking; Elementary Education; *Elementary School Students; *Elementary School Teachers; Moral Development; Questionnaires; *Teacher Attitudes; Teaching Methods; *Theory Practice Relationship

ABSTRACT

A descriptive study of teacher perceptions of critical thinking skills and implementation of teaching behaviors that foster critical thinking was carried out. Participants were 30 teachers at an elementary school in a small, affluent community in the San Francisco Bay area. Data were gathered by means of a questionnaire administered to a consensus group of classroom teachers, administrators, and others with doctoral degrees and interest, experience, or training in critical thinking skills and strategies. Data were also obtained through a self-study survey of 14 primary school teachers and classroom observation of 80 second graders and 82 kindergartners. Seven 30-minute observation periods were used to gather information on instructional strategies, student involvement, and interaction between teachers and students. Findings indicated that there was a gap between the theory of critical thinking and the instructional strategies that teachers used in their classrooms. Several areas for further investigation are identified. The study's review of literature traces the theoretical relationship between critical thinking, cooperative leaning, problem solving, moral development, and decision making. The critical thinking questionnaire is appended. A total of 45 references are cited. (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED319497

PS

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

CRITICAL THINKING:

TOWARD INTELLECTUAL ACCOUNTABILITY AND SOCIAL RESPONSIBILITY

a research project on
critical thinking,
cooperative learning and
moral development

Rebecca Rosales

A thesis submitted to the faculty of Dominican College
Department of Education in partial fulfillment of the
requirements for the degree of
Master of Science in Education

May, 1990
San Rafael, California

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Rebecca Rosales

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 018779

Running Head: Critical Thinking

BEST COPY AVAILABLE

ACKNOWLEDGMENTS

It is with a tremendous appreciation and a sincere thanks that I acknowledge the direction, support and encouragement I received from the faculty in the Department of Education at Dominican College throughout my work on this project. I especially want to thank Dr. Barry Kaufman, Department Chair and Dr. Madeline Peters for their supervision and guidance.

Recognition should also go to my school principal, mentor and friend, Sheila Puckett, who has helped me shape who I am as a teacher and as a student and allowed me the freedom to be both.

I would also like to thank my family for their understanding and encouragement, my husband, Enrique for his patience and my children, Rena and Antonio, for renewing my commitment to a better vision of education for their future.

ABSTRACT

The rising concern about the need for our students to be intellectually, socially and morally responsible adults is influencing an emphasis on the explicit teaching on higher-level cognitive skills. This paper traces the development of a theoretical relationship between critical thinking, cooperative learning and moral development. The paper includes a descriptive study of teacher perceptions of specific critical thinking skills and implementation of teaching behaviors that foster critical thinking. The study focuses on 15 teachers at an elementary school in a small, affluent community in the San Francisco Bay Area. The research study includes a questionnaire, self-study data and observational reports. Results indicated that there is a gap between the theory of critical thinking and the instructional strategies that teachers use in their classrooms. Finally, this paper identifies several areas for further dialogue and future research among theorists, researchers, curriculum designers and classroom teachers.

TABLE OF CONTENTS

	page
Introduction	1
Statement of the Problem	2
Rationale	3
Background and Need	5
Review of the Literature:	
Components of Critical Thinking	8
Review of the Literature:	
Key Ideas in Contemporary Research	10
Educational Research Method:	
Purpose	19
Subjects	19
Instruments	20
Procedure	21
Results	22
Discussion	25
Observations	26
Reflections	29
Implications	32
Appendix:	
Questionnaire	34
Self study Survey	35
Observation Report	36
References	37

INTRODUCTION

One of the crucial issues facing educators today is the question of how to prepare our students to be the intellectual leaders and global citizens of the next century. Professionals charged with the responsibility of educating today's children must include the critical thinking process as an integral part of the school curriculum in order to promote student involvement, responsibility, and decision making as well as increased intellectual development.

For the members of the Task Force on Teaching as a Profession all students should be :

> "active learners, busily engaged in the process of bringing new knowledge and new ways of knowing to bear on a widening range of increasingly difficult problems. The focus of school must shift from teaching to learning, from a passive acquisition of facts and routines to the active application of ideas and problems." (A Nation Prepared, 1986, p. 25)

Will these future leaders be able to formulate opinions and influence national priorities? How will they resolve issues of world hunger and the ever increasing population? Will they find solutions to the problems of homelessness and drug, alcohol, and child abuse? What will they do when faced with decisions on nuclear energy or genetic research?

The California Commission on the Teaching Profession clearly believes that the most important element of democracy is the ability of its citizens to form educated opinions and make sound judgments. Active participation in society demands a more profound knowledge of history, greater scientific literacy and increased proficiency in thinking critically. (Who Will Teach, 1985)

STATEMENT OF THE PROBLEM

Is school curriculum being modified and are instructional methods being implemented in order to fully utilize critical thinking strategies and processes as a means of developing reasonable, cooperative and responsible action in students? Among educators, critical thinking has become a term used inconsistently and interchangeably with other terms, including problem solving strategies, cognitive skills, higher level thinking skills, intellectual processes, meta-cognition, logical thinking and reasoning skills. (Frisby, 1990)

According to Paul, (1988), the final product of education is the the development of students with inquiring minds:

> A passionate drive for clarity, accuracy, and fair-mindedness, a fervor for getting to the bottom of things, to the deepest root issues, for listening sympathetically to opposite points of view, a compelling drive to seek out evidence, and intense aversion to contradiction, sloppy thinking, inconsistent application of standards, a devotion to truth as against self-interest -- these are essential components of the rational person. (Dimensions of Thinking, page 2)

RATIONALE

According to the 1987 Gallup Poll on education, parents want schools to help teach students to behave ethically as well as have the ability to think critically. (cited in McMillan & Gentile, 1988) Many parents and educators agree that school plays an important role in teaching moral literacy and helping students internalize ethical standards for what is right and wrong. Youngsters growing up today are observing that people in responsible, public positions do unethical and even illegal things.

Coles, (1990), as project director for a survey on the moral life of American schoolchildren found that there was evidence of creative and intelligent thinking demonstrated by students today, but that there did not seem to be any conscience developing. He states, "schools are for

the education of the whole person, and it is the responsibility of the schools to inculcate character." (Meade, p.41)

In his work on cooperative learning, Kagan, (1985) recognizes a number of ramifications for students who lack the ability to work with others. He states, "A large study examining the reasons for job loss among first-time employees revealed that the most common cause of losing a job - far more common than lack of job-related skills -- was lack of social skills." (p.13) Students leave school unprepared for participation in society and the work force. He cites evidence that if traditional classroom structures and models are used exclusively, competition is generally the result. If cooperative classroom structures are used, students become more cooperative.

For this reason, schools cannot keep from being involved in moral and social development. The question for educators then becomes not IF the school is involved in socializing students, but HOW the school will effect the social development of students.

We need cooperative learning and critical thinking in order to preserve social values, moral behaviors and democratic principles. Authoritarian, teacher-dominated classrooms give students no model for problem solving or

involvement in a participatory decision making process. (Johnson, Johnson, Holubec & Roy, 1984) Walsh (1988) calls this type of teaching "obedience training". Students are conditioned to passively accept rather than actively question. Students do not learn to rely on their own thinking. They never learn to see themselves as thinking authorities.

The responsible educator should use critical thinking strategies when including ethical issues in the school program. (Lipman, 1988). Above all, teachers must not impose their own personal moral beliefs on students. This goes against the democratic and intellectual premise of the goals of public education. (Lipman, cited in Brandt, 1988b; Paul, 1985a) There is a big difference between being a role model and being a dictator. Helping students utilize their own capacity for reason, problem-solving, decision making and judgment is our safeguard against moral indoctrination.

BACKGROUND AND NEED

Paul, (1985b) identified over 1500 research articles related to critical thinking. A variety of studies, projects, frameworks and strategies are available to

contribute to the implementataion of critical thinking instruction.

The concern for teaching people to think is not a new one. In the early part of this century, Dewey's strategy for reflective thinking was viewed as a model for educators to get students to think rather than just memorize. His famous five steps for problem-solving have become the basis for inquiry strategies and are widely applied in many different curriculum areas:

1. recognizing that a problem exists
2. defining and delimiting the problem
3. forming a related hypotheses concerning the problem
4. gathering data and forming conclusions based on that data
5. testing the conclusions and noting the consequences of the conclusions (Jarolimek, 1981)

For Dewey, reflective thinking was a means to a specific end, namely moral education. Children discover what is right and wrong through a constant critical inquiry. Questions on values can be raised and then pursued by the student. When the student arrives at a sense of what is right, he or she automatically accepts it because it is the solution to the

problem that was being solved. Discovery becomes action. For educational philosophers then, the challenge of moral education became, and continues to be, the challenge of developing the practice of critical thinking in all aspects of schooling. (Beck, 1981)

Piaget's work on cognitive development has also had an influence on our understanding of thinking. He describes cognitive development by showing how children perceive the world at each particular stage of development and he describes the processes that allow a child to develop.

Piaget's concept of equilibration enables us to view intellectual development as the process of restructuring knowledge. There are four stages:

1. The process starts out at a particular thinking level
2. Some external disturbance to this thinking creates conflict - or disequilibrium
3. The intellectual activity of the individual compensates for the disturbance and resolves the conflict
4. This resolution gives a new understanding and satisfaction, a new equilibrium (Labinowitz, 1980, p. 35)

Many other educational philosophers, psychologists and curriculum developers have contributed to our understanding

of critical thinking and what it means, but much of the theorerical knowledge in this area is based on the work of Dewey and Piaget.

REVIEW OF THE LITERATURE

Components of Critical Thinking

The American public school system continues to be the target of a great deal of criticism. (Adler, 1982; Bennett, 1988; Bloom, 1987; Goodlad, 1984; Hirsch, 1987; and Honig, 1987) One common element of their collective work is that it calls for correction and improvement of the American school system. A dissatisfaction with and lack of confidence in traditional instructional practice seems to be the foundation of the heightened interest in critical thinking.

There tends to be more agreement regarding the process of teaching critical thinking. The strategies associated with thinking are broad and shared by many theorists, researchers and educators, which has led to the development of different thinking skills taxonomies. There is a fair amount of consensus regarding the sub-skills of critical thinking. (Quellmalz, 1987) The cognitive problem-solving

process of psychology is merged with the meta-cognitive skills of philosophy to create a problem-solving framework. (Beyer, 1988)

Critical thinking theorists also agree that the thinking skills must be grounded in school content. The problem-solving process must have a purpose or it becomes a misguided, process-dominated approach. Smith states, "Anytime you reduce teaching to a model, you're in trouble, because models give us formulas and formulas squeeze the life out of teaching. The highly effective teacher will design his or her own way of teaching." (Brandt, 1987, p.36)

Teachers need to understand the logical operations that are involved in the structure of their subject matter and master the pedagogical strategies and skills required to teach them. Thinking does not come prepackaged. (Barbour, 1988) Ultimately, educators want children to teach themselves ways to solve their own problems. In this environment, the teacher is a facilitator, not a director.

There has been a great deal written on the application aspects of critical thinking. Researchers and curriculum developers have examined specific instructional methods and detailed how they can be used to promote critical thinking and cognitive development in students. Costa and Marzano

(1987) describe how the use of precise terminology allows students to develop a shared meaning of cognitive terms. A number of educators have looked at the types of questions teachers ask, and made suggestions on how to probe for deeper meaning and enhance cognitive thinking abilities. (Bippus, 1988; Costa, 1987; Gall, 1984; Paul, 1988; Strother , 1989; Thomas, 1988) Model lessons can be used effectively in the teaching of critical thinking skills. Some educators use Madeline Hunter's five point lesson plan. (Strong, Silver & Hanson, 1985); Others use Bloom's taxonomy as the basis for lesson design. (Carr, 1988 ; Quellmalz, 1985) Eulie (1988) recommends the developmental lesson format for introducing thinking skills.

Cooperative learning lesson strategies are being used throughout the range of critical thinking action plans. Cooperative learning promotes the use of higher level thinking skills, reasoning strategies and competence in critical thinking. (Johnson, Johnson, Holube & Roy, 1984)

Key Ideas in Contemporary Research

Paul (1985c) presents his analysis of where we are now in the "critical thinking movement" and where we ought to be

going with it. He is convinced of five things:

1. There are deeply rooted tendencies in all of us to use cognitive and affective processes to promote self-serving interests.

2. The logic of the real world is messy. Problems of everyday life do not have easy solutions that follow some technical procedure. Everyday problems are rarely settled in a purely rational way.

3. Schools have focused on the technical domain type problems, determined by a self-consistent, closed system.

4. Our capacity to command our affective and cognitive processes is heavily influenced by our early years, both at home and at school.

5. Teaching strategies need to be revised across the board to reflect the development of dialectical knowledge and skills.

Paul believes that a distinction needs to be made between two views of critical thinking: critical thinking in the weak sense and critical thinking in the strong sense. Critical thinking in the weak sense represents the analytic, critical thinking sub skills. Critical thinking in the strong sense is the end result, the ability to utilize macro-logical skills that lead to emancipatory reason. It is the strong sense critical thinking skills that are essential to the free, rational, autonomous mind.

Paul focuses on long term strategies for developing strong sense critical thinking and recognizes the obstacles

that will be encountered before those goals are reached. Theorists and educators must recognize the need for dialogue and opposition, or there is no dialectical process at work. Theorists and educators need to accept that dialectical reasoning is not based on procedures, but on principles. Theorists and educators must find a way to continue to fight against one of the pitfalls of ethical educational issues - indoctrination.

Dialectical knowledge cannot be merely defined and/or accepted as opinion. It is macro-logical synthesis. It represents reasoned judgment. The process of reaching a reasoned judgement is like a jury arriving at a verdict, founded in principles, reasoning and evidence.

For Paul, dialectical thought is the master-principle of all rational thought and absolutely crucial to human emancipation.

> It cultivates the mind and orients the person as technical training cannot. It meets the need of persons to bring harmony and order into their lives, to work out an amalgamation of ideas from various dimensions of experience, - to achieve, in short, INTELLECTUAL, EMOTIONAL, AND MORAL INTEGRITY. (Paul, 1985c, p. 159, capitals mine)

Problem-solving can occur at several levels: at an intellectual level, at a social/emotional level, and at a

moral level. In what ways do these three areas overlap? What are the ramifications for application of critical thinking and thought development in these areas?

Lipman (1988) supports Paul's concept of critical thinking. Lipman sees wisdom as the outcome of good judgment and good judgment a characteristic of critical thinking. For him, critical thinking is skillful, responsible thinking that facilitates good judgment because it relies on criteria, is self-correcting, and is sensitive to context. It is a form of "cognitive accountability", an intellectual responsibility teachers have to demonstrate thinking processes, cite criteria for decisions and correct faulty reasoning in themselves and in their students. For Lipman, the goal of education is more than just getting students to think. It is as important that they demonstrate good judgment, which cannot function without a foundation of good reasoning skills.

Cooperative learning strategies enable students to further their interpersonal problem-solving abilities while engaged in meaningful classroom, academic content activities. (Bell & Scheidewinde, 1987) A climate of trust and respect can be developed where different opinions and values are expressed. Activities should be provided where each

student's contribution becomes necessary for the group to successfully complete its task. Students have the opportunity to become self-reflective and can take risks and try out new ideas and behaviors in a nonthreatening environment. Mastery of these group skills can foster a collaborative work style and develop a collective classroom identity. Students gain the skills to work effectively and democratically in groups and can directly translate these skills later to the world outside of school.

Kohn (1990) examines a research study that looks at the effect of instruction in cooperation and collective problem-solving on the elementary school children's social skills, interaction and problem-solving behavior. He reports that testing and systematic monitoring of student participants have failed to show consistent and statistically significant results in all cases between the program schools and the comparison schools. Incomplete information was given regarding the specific test population and no discussions of the test instrument, or the reliability and validity of the measurement instruments were included. By informal observation and anecdotal accounts, the program was very successful. Teachers felt that students involved in the study group were more likely to be spontaneously helpful and co-operative,

were better able to understand conflict situations and more likely to take everyone's needs into account in resolving them than their counterparts in the other schools.

Coles and Genevie (1990) cite results of a moral values survey. Responses from students in grades 4 through 12 show a variety of forms of moral logic which influences moral decision making. This logic and the foundation of assumptions it rests on serve as, in Coles' words, "a moral compass" that helps students find their way in times of uncertainty and challenge:

> When the basic moral assumptions are oriented toward self gratification or enhancement, similar moral decisions follow. When real concern for others (or social and religious authority) are at the core of the decision making process, more altruistic decisions emerge. (Coles & Genevie, 1990, p. 46)

Information regarding the total number of students involved in the study was not provided. A very brief, incomplete description of the survey was cited, but a sample was not included. No discussion of the validity or reliability of the measurement instrument or test results was provided. Coles and Genevie believe that educators have an opportunity to address the issue of what is required intellectually and morally of students in school and suggest that teachers help students understand the sources for their

assumptions, values, ideals and principles, and the consequences of inconsistent moral standards.

The work of Houtz and Denmark (1983) clearly shows the importance of a teacher's role in establishing a positive classroom climate and stressing cognitive skills. The teacher is the intellectual presence who arranges the environment in a way that enables students to take over more of the instructional or learning responsibility.

This study was a correlational study involving 207 fourth through sixth grade students and 14 teachers. The researchers administered a classroom activities questionnaire and several thinking skills tests in an effort to study the relationship between cognitive classroom structure and development of creative thinking and problem solving skills. Cognitive classroom structure refers to the organization and focus a teacher has on reinforcing and encouraging a variety of higher level thinking skills within the framework of the everyday curriculum.

Specific information regarding the sample population, the measurement instruments and the test reliability and validity were mentioned. Both boys and girls of a middle-class, caucasian community participated in the study.

Their results show that in classes where students perceive an increased emphasis on higher level thinking

skills, there is likely to be more fluent thinking. Greater fluency appears to occur in classes where students sense a climate of acceptance and support for independence, divergence of ideas, humor and enthusiasm for learning.

Results of the 1989 Gallup/Phi Delta Kappa Poll of Teachers' Attitudes Toward Public Education show that teachers believe they need to instill a desire for life-long learning in their students and encourage them to think - creatively, objectively and analytically. (Elam, 1989)

Costa (1985) suggests a number of instructional strategies intended to develop and enhance the "meta-cognitive" or personal, internal decision making/problem-solving processes of students. Students who possess the ability to know what they know and what they don't know, who are conscious of their own steps and strategies in problem solving, who reflect on the effectiveness of their own thinking, in other words, those who possess developed meta-cognitive abilities, perform well on complex cognitive tasks.

Costa (cited in Brandt) outlines a way for teachers to determine their effectiveness in teaching thinking. He directs teachers to first look carefully and critically at

the intelligent behavior of their students. Do they demonstrate the ability to apply knowledge in new ways, to comprehend what they see and read, to follow directions and to describe their own thought process? Costa states:

> The reason I suggest focusing on desired student behavior first is that it can be less threatening to teachers. If you begin by focusing on the skills of teaching, some teachers will take it as criticism of the ways they have been teaching. (Brandt, 1988a, page 13)

Secondly, he believes that teachers need to talk about what it is that they want students to do. Impulsive teaching must be replaced by a plan of action. Collectively, a positive vision should be articulated and indicators developed in order to judge progress. Teachers must model a cooperative and intellectual process.

Costa is opposed to developing a standard set of competencies in order to measure teacher performance in teaching critical thinking. A checklist of teacher behaviors is not, he feels, an adequate or appropriate measure of that performance. His examination of research on effective teaching has shown that not all teachers have used the same behaviors or strategies, yet have had satisfactory results. Still others who have used these behaviors and strategies have had poor or no results.

In order for teachers to effectively teach critical thinking, they must recognize their own intellectual accomplishment and be able to communicate what they know and how they think to others. Teachers who focus on how to think and not what to think are truly teachers. This is the crucial function and challenge of the teacher. (A Nation Prepared, 1986)

METHOD

PURPOSE

The purpose of this review has been to identify and trace the broader theoretical relationship between critical thinking, cooperative learning, problem solving, moral development and decision making. This study examines teacher perceptions of critical thinking and implementation of instructional strategies that foster critical thinking in students in a specific single school environment.

SUBJECTS

Thirty adults were involved at different stages of the study. A consensus group was asked to provide responses that served as the frame of reference throughout the later phases of the study.The consensus group consisted of 15 educators from the San Francisco Bay Area with interest,

experience or training in critical thinking skills and strategies. Five members of the consensus group were classroom teachers, five were administrators and five held doctorate degrees in education and related fields.

The self study group consisted of 14 K-2 grade classroom teachers in a small, suburban school district in Marin County. Seven teachers from the self study group formed the observation group. This group consisted of four kindergarten and three second grade teachers. Eighty second graders and 82 kindergarten students participated during the observation periods.

INSTRUMENTS

The consensus group was asked to complete a questionnaire designed to:

1. solicit definitions of critical thinking,
2. determine the purposes for teaching critical thinking,
3. arrive at some degree of agreement on the specific skills of critical thinking
4. identify the teaching behaviors that promote critical thinking.

A self study survey was developed for use by the 14 K-2nd grade teachers to measure teacher perceptions of their

own classroom climates and instructional strategies regarding teaching of critical thinking.

An observation instrument was designed based on information gathered in the self study surveys and used with the seven observation group teachers and their classes. The instrument was used to record teacher behaviors, interaction in the classroom and student responses.

PROCEDURE

Phase 1: The 15 consensus group members were mailed questionnaires and 93% of the group responded.

100% of the classroom teachers

100% of the administrators

80% of the Ph.D. group

The collective responses of the consensus group were analyzed and used in the formulation of a two part self study survey. In part one, respondents were asked to numerically rank a list of twelve specific critical thinking skills generated by the consensus group in order of their perceived importance. In part two, they were asked to similarly rank six teacher behaviors that influence and promote critical thinking.

Phase 2: The self study survey was completed by 15 K-2nd grade teachers as part of a regularly scheduled faculty meeting. Teachers were asked only to fill out the survey as part of a study project and were not given any additional details about the research.

Phase 3: Each of the seven teachers in the observation group was observed by two observers and their findings were recorded on the observation instrument.

RESULTS

The consensus group identified 21 specific skills of critical thinking from a list of 30. Fifty percent or more of the respondents listed eleven of those skills. Complete agreement was found on two of those skills.

analyzing	100%
questioning	100%
comparing	78%
observing	64%
contrasting	64%
judging	64%
exploring	57%

relating	50%
classifying	50%
listening	50%
reflecting	50%
defining	29%

From a list of 15 teacher behaviors, six were identified by the consensus group as instructional strategies likely to enhance a student's ability to think critically. The consensus group was asked to numerically rank these behaviors, a number one signifying the behavior believed to be most important, a number two signifying the behavior believed to be the second most important, and so on. Only 64% of the consensus group provided specific enough information in this part of the questionnaire for use here. Forty-four percent or more of the respondents gave three of these behaviors a score of 1 or 2.

1. stimulate the imagination	55%
2. pose higher level cognitive questions	44%
3. facilitate class discussion	44%
4. solicit student questions	33%
5. ask clarifying questions	11%
6. leave time between questions and responses	11%

In the 14 member self study group's numerical ranking of the identified list of critical thinking skills, seven skills received a score of 1, 2 or 3 from 29% or more of the total number of respondents. Two received a score of zero.

listening	57%
observing	43%
exploring	43%
reflecting	36%
analyzing	29%
questioning	29%
defining	29%
classifying	14%
contrasting	14%
comparing	7%
judging	0
relating	0

The identified teacher behaviors and instructional strategies ranked by the self study group were examined in a similar way. Two behaviors received a score of 1 or 2 from 43% of the total number of respondents.

1. stimulate the imagination	43%
2. pose higher level cognitive questions	43%
3. leave time between question and response	35%
4. ask clarifying questions	29%
5. facilitate class discussion	29%
6. solicit student questions	21%

DISCUSSION

Several things are immediately apparent after looking at the data. First, in the list of specific critical thinking skills generated by the consensus group, there were two items which all repondents identified as important, analyzing and questioning. In the self study ranking, analyzing and questioning fall in the middle of the listing, with only 29% of the teachers viewing them as skills of significant importance on the list. Listening is a skill that appears more highly desired by the classroom teachers, evidenced by its first place position in the self study rank, than by the consensus group. It appeared tenth on the list generated by the consensus team. The skills of judging and relating received no scores of 1, 2 or 3 from any member of the self study group. Fifty percent the consensus group identified these items as essential components of critical thinking.

In the list of teacher behaviors that enable students to think critically, both the consensus group and the self study group value stimulating the imagination and posing higher level cognitive questions above all others. An emphasis here seems to be on fostering creative, divergent thinking in students so they can become more effective problem solvers.

Another interesting difference is the self study group's low priority of facilitating class discussion and soliciting student questions. The consensus group found these teacher behaviors more effective strategies for promoting critical thinking than increased wait time after posing a question or asking clarifying questions.

OBSERVATIONS

During the seven 30 minute observation periods, specific information on instructional strategies, student involvement and teacher/student interaction was gathered. Two observers visited the classrooms of each observation group teacher and recorded their findings in narrative form. The observation reports show that teachers may be aware of many of the important critical thinking skills, cooperative learning techniques and instructional strategies, but teachers still

rely heavily on traditional formulas for teaching, management and student response.

The observers found four of the classes involved in total group activities. One teacher was using a direct drill and practice lesson format, where a factual question was asked and the class collectively recited the response. After every fourth or fifth question, an individual student was singled out to respond.

Another teacher had her students sitting in a circle on the rug and presented a lesson to them. Students listened as the teacher provided all the information of the lesson and were not invited to ask any questions during or after the presentation.

A third teacher had the students involved in a variation of the Twenty Questions game. Students took turns asking yes/no questions in their collective attempt to guess the object inside of a coffee can. The teacher encouraged them and urged them to "ask about the properties of my thing." The same five or six students seemed to ask most of the questions. The item was not correctly guessed in the observation period.

The fourth teacher facilitated a class lesson that had each student doing something. Twenty-five short task

stations were set up all around the room for students to do. They were directed to record their results upon completion of each task. The teacher allowed about one minute at each task and then directed students to move quickly to the next station. At the end of the task period, the teacher gave the students a few minutes to go back to any items not completed and asked those who were finished to assist any students who needed help. At the close of the observation period, she gathered students in a circle for a discussion of the activity and their findings. The discussion was not observed.

Three of the classes were observed while engaged in small group activities. The classroom teacher, a paid classroom aide and a parent volunteer were present in each case. One teacher had self-directed activities set up for the students at tables in the classroom. Students had five different choices and could move from table to table as they wanted to. Two students were especially encouraged by the teacher to go to a specific table and they did so willingly. Each table had an activity that focused on a different set of skills: estimation and counting; prediction and verification; problem-solving; visual perception; and fine motor control.

The three adults circulated around the activity tables and assisted or intervened when necessary. All three asked the students questions as they worked. "How did you get that answer?" and "What did you find out?" were two examples.

Another teacher had divided the class into three groups. Each group was assigned to work with one of the adults on a specific task. The parent made and explained a Venn diagram. The classroom aide demonstrated an art activity and the students copied it. The teacher sat with a group completing workbook pages. In all three activities, the student output was identical to that of others in the same group. Students did not ask questions. They followed directions.

A third teacher had her class working in two groups. The classroom aide and the parent volunteer were monitoring and assisting pairs of students playing skill building games. The teacher had the other half of the class involved in a discussion. The teacher asked open ended questions, encouraged students to answer each other's questions, asked clarifying questions and asked students to cite examples and give evidence to back up their arguments.

REFLECTIONS

There appears to be a gap between the theory of critical thinking and the practice of teaching it. The data collected

from the observations show that there is a discrepancy between the ranking of important teacher behaviors and critical thinking skills and the actual skills and strategies that are a part of everyday classroom instruction. Is this another example of not practicing what is preached or merely a function of the fact that critical thinking skills are perceived as less important somehow than the "basic skills", the fundamentals of reading, writing and computation? The answer probably includes a little of both.

Efforts are being made by some teachers to modify their instructional style and expand lesson formats to include more cooperative activities and higher level cognitive skills, but these individuals are outnumbered by a majority who do not. In the observations, there was little evidence of stimulation of the imagination or of an effort to solicit student questions. Few teachers really posed higher level thinking questions to their students or asked clarifying questions.

The high ranking of listening as an essential skill of critical thinking by the self study group is consistent with evidence from the observations. Teachers emphasize and require of their students the ability to sit quietly and listen for a major part of their school day. A majority of

repeating, -a drill and practice model, basically. Most activities did not seem to promote analyzing, questioning, comparing, observing, contrasting, judging, exploring, relating, classifying, or reflecting, all skills which 50% or more of the consensus group considers part of critical thinking processes.

Many teachers seem to still feel uncomfortable with a laboratory learning environment. Dialogue between teachers and students or students and other students creates classroom noise. A great number of teachers distrust group work among students, expecting that one or two students do the work for the whole group. A desk arrangement of rows is generally not conducive to fluid discussion. A teacher who acknowledges that he or she is still a learner is perceived to lose authority. Formulating hypotheses and conducting experiments takes more time than a straight, no frills teaching of the facts. Standardized tests do not report on a student's ability to think, or on how a student reacts when faced with a question or a problem to which he or she does not know the answer. These are just some of the arguments and obstacles facing the vision of critical thinking and moral development discussed previously.

IMPLICATIONS

It is clear from both critical thinking theory and research that in order to develop reasonable, cooperative and responsible action in students, educators must model and teach higher level thinking and problem-solving skills. Teachers must come to value teaching how to think as much as they value what to teach. Critical thinking skills must take their place beside fundamental skills and become part of what is known as the "basic skills".

In order to produce fully functioning citizens for the next century, educators will need to instill in students a process for analyzing information, collecting data, evaluating options, weighing consequences, formulating conclusions and judging actions. All these steps will be necessary for individuals to be able to make correct, just and moral decisions in their personal, professional and political lives.

If this is to happen, current teachers will have to be completely convinced and will need to retrain their own thinking. The changes in their understanding of their role in the classroom and the top instructional priorities will undoubtedly cause an identity crisis for some. Teachers will need to turn to each other and seek out successful role

models for critical thinking instruction. Teacher training programs will need to include theory, modeling and instruction in critical thinking.

Theorists, researchers, curriculum designers and classroom teachers will need to work together to develop appropriate and fair assessment strategies for measuring critical thinking skills demonstrated by students. Some of the current studies on cooperative test taking and student work portfolios indicate that a dialogue has already begun. Teachers will need a systematic way to evaluate their effectiveness in teaching critical thinking and meta-cognitive skills. Teachers will need these resources as they actively seek ways to include work on critical thinking skills and problem-solving strategies as part of every school day.

APPENDIX

CRITICAL THINKING QUESTIONNAIRE

I. BACKGROUND INFORMATION

1. NAME_____ 2. M☐ F☐ 3. UNDER 40 ☐ OVER 40 ☐
4. EDUCATION: B.A./B.S. ☐ GRAD. LEVEL COURSEWORK ☐ M.A./M.S. ☐
   ADMIN. CRED. ☐ PHD. ☐ RESEARCH FIELD_____
5. TEACHING EXPERIENCE: NUMBER OF YEARS_____ GRADE LEVELS _____
6. SPECIFIC TRAINING IN CRITICAL THINKING_____
   _____

II. DEFINITION : WHAT IS CRITICAL THINKING?

Indicate your level of agreement or disagreement with the following statements. Mark "7" if you agree very strongly with the statement and mark "1" if you strongly disagree. Numbers 2 - 6 should be used if your response falls in between these two.

a. Critical thinking means rational thinking.	1	2	3	4	5	6	7
b. Critical thinking means reasonable reflective thinking that is focused on deciding what to believe or do.	1	2	3	4	5	6	7
c. Critical thinking means communication and problem-solving skills based on scientific, philosophical and technological literacy.	1	2	3	4	5	6	7
d. Critical thinking means the ability to think rationally, express thoughts clearly and to read and listen with understanding.	1	2	3	4	5	6	7
e. Critical thinking means the process leading to the selection of one of several options after consideration of the facts, ideas, alternative solutions, consequences and values.	1	2	3	4	5	6	7
f. Critical thinking means thinking in a systematic fashion in order to determine the truth of an argument.	1	2	3	4	5	6	7
g. Critical thinking means using basic thinking processes to analyze arguments and generate insight into particular meanings and interpretations.	1	2	3	4	5	6	7

III. PURPOSE: WHY TEACH CRITICAL THINKING?

a. The teaching of critical thinking is important because the level of development of a country is measured by the level of development of its people's intelligence.	1	2	3	4	5	6	7
b. The teaching of critical thinking is important because in order be informed global participants in the 21st century, it must be a fundamental goal.	1	2	3	4	5	6	7
c. The teaching of critical thinking is important because the principal goal of education is to develop students who are capable thinking and acting in creative and inventive ways.	1	2	3	4	5	6	7
d. The teaching of critical thinking is important because education ought not to fill the minds of students with facts, but teach them to always think for themselves.	1	2	3	4	5	6	7
e. The teaching of critical thinking is important because good citizenship demands a working understanding of our social, political and economic structures.	1	2	3	4	5	6	7
f. The teaching of critical thinking is important because sound moral judgment cannot be present unless it is founded in proficient reasoning skills.	1	2	3	4	5	6	7
g. The teaching of critical thinking is important because its epistemological character reflects the canonical status and cultural assumptions about the nature and value of knowledge.	1	2	3	4	5	6	7

IV. COMPONENTS: WHAT SKILLS DO WE REALLY MEAN WHEN WE SAY CRITICAL THINKING?

Mark the ten skills you believe a student must have in order to think critically.

☐observing	☐reciting	☐comparing
☐contrasting	☐recalling	☐mastering
☐relating	☐grouping	☐labeling
☐classifying	☐reflecting	☐analyzing
☐ordering	☐imitating	☐remembering
☐sequencing	☐patterning	☐responding
☐drilling	☐repeating	☐defining
☐exploring	☐questioning	☐judging
☐co-operating	☐practicing	☐knowing
☐listening	☐sensing	☐feeling

other:_____ _____ _____

V. HIERARCHY OF THINKING SKILLS: ARE SOME SKILLS BUILDING BLOCKS FOR OTHERS?

Numerically rank the following steps in a critical thinking process. Put a number one by what you consider the first stage, a two by the second and so on.

☐ Calculate a prediction	☐ Classify information
☐ Observe a problem	☐ Formulate a conclusion
☐ Make a decision	☐ Build a model
☐ Strive for precision	

VI. TEACHER BEHAVIORS: HOW CAN CRITICAL THINKING BE TAUGHT?

In order to teach critical thinking skills a teacher must:

YES	NO	
____	____	☐ present information in lecture format
____	____	☐ pose higher level cognitive questions
____	____	☐ always give detailed instructions
____	____	☐ make I statements to students
____	____	☐ insist on independent work
____	____	☐ give students immediate feedback
____	____	☐ maintain a rapid pace
____	____	☐ ask clarifying questions
____	____	☐ praise each correct response
____	____	☐ dictate and enforce classroom rules for students
____	____	☐ stimulate the imagination
____	____	☐ solicit student questions
____	____	☐ facilitate class discussion
____	____	☐ provide answers readily
____	____	☐ leave time between questions and responses

In the boxes provided above, rank your "yes" teacher behavior responses. Put a number one in the box beside the teaching behavior you consider to be most important, a two in the box beside the second most important behavior and so on.

VII. COMMENTS

CHECK HERE IF YOU WOULD LIKE A COPY OF THE RESULTS OF THIS QUESTIONNAIRE. ☐

CRITICAL THINKING SURVEY

A questionnaire was sent to 16 Bay Area educators in order to generate a listing of specific skills and teaching behaviors that can lead to critical thinking in students.

Listed below are the responses that occurred most frequently. Please rank them from 1 - 12 in order of importance. For example, put a 1 in the box by the item you consider the most important item, a 2 in the box by the second most important item, and so on.

COMPONENTS: WHAT SKILLS DO WE MEAN WHEN WE SAY CRITICAL THINKING?

- ☐ defining
- ☐ listening
- ☐ analyzing
- ☐ observing
- ☐ questioning
- ☐ comparing
- ☐ judging
- ☐ classifying
- ☐ contrasting
- ☐ relating
- ☐ exploring
- ☐ reflecting

TEACHER BEHAVIORS: HOW CAN WE INFLUENCE CRITICAL THINKING?

- ☐ ask clarifying questions
- ☐ leave time between questions and responses
- ☐ facilitate class discussion
- ☐ solicit student questions
- ☐ stimulate the imagination
- ☐ pose higher cognitive level questions

COMMENTS:

OBSERVATION REPORT

TEACHER	GRADE	NO. OF STUDENTS
DATE	SUBJECT AREA	OBSERVER

Please record the lesson observed and the student responses in narrative form.

REFERENCES

Adler, Mortimer J., (1982). The Paideia Proposal: An Educational Manifesto. New York, N.Y.: Macmillan Publishing Co.

Barbour, Nita H., (1988). Can We Prepackage Thinking? Childhood Education. Winter, 67-68.

Beck, Clive, (1981). The Reflective Approach to Values Education. In Philosophy and Education, the Eightieth Yearbook of the the National Society for the Study of Education (pp. 185-211) Chicago, Illinois: University of Chicago Press.

Bell, Lee & Schneidewinde, Nancy, (1987). Reflective Minds/ Intentional Hearts: Joining Humanistic Education and Critical Theory for Liberating Education. Journal of Education, V. 169, No. 2, 55-77.

Bennett, William J., (1988). Our Children and Our Country. New York, N.Y.: Simon and Schuster Co.

Beyer, Barry K., (1988). Developing a Scope and Sequence for Thinking Skills Instruction. Educational Leadership, April, 26-30).

Bippus, Stanley L., (1988). Think Before You Ask. Educational Leadership, April, 50-51.

Bloom, Allan, (1987). The Closing of the American Mind. New York, N.Y.: Simon and Schuster Co.

Brandt, Ron, (1988a). On Teaching Thinking: A Conversation With Art Costa. Educational Leadership, April, 10-13.

Brandt, Ron, (1988b). On Philosophy in the Curriculum: A Conversation with Matthew Lipman. Educational Leadership, Sept., 34-37.

Brandt, Ron, (1987). On Teaching Thinking Skills: A Conversation with B. Othanel Smith. Educational Leadership, October, 35-39.

California Commission on the Teaching Profession, (1985). Who Will Teach the Children? A Strategy for Improving California's Schools.

Carr, Kathryn S., (1988). How Can We Teach Critical Thinking? Childhood Education, Winter, 69-73.

Coles, Robert & Genevie, Louis, (1990). The Moral life of America's Schoolchildren. Teacher Magazine, March 1990, 43-49.

Costa, Arthur, (1985). Mediating the Meta-cognitive. Educational Leadership, Nov., 57-62.

Costa, Arthur & Marzano, Robert, (1987). Teaching the Language of Thinking. Educational Leadership, October, 29-33.

Elam, Stanley M., The Second Gallup/Phi Delta Kappa Poll of Teacher's Attitudes Toward the Public School, Phi Delta Kappan, June, 1989, pp. 792-798.

Eulie, Joseph, (1988). Teaching Understanding and Developing Critical Thinking. The Social Studies, Nov./Dec., 260-265.

Frisby, Craig, (1990). Toward a Broader Role for School Psychology in the Thinking Skills Movement. School Psychology Review, Vol. 19, No. 1, pp. 96-114.

Gall, Meredith, (1984). Synthesis of Research on Teachers' Questioning. Educational Leadership, Nov., 40-47.

Goodlad, John, (1984). A Place Called School: Prospects for the Future. New York, N.Y.: McGraw Hill Book Co.

Hirsh, E.D., (1987). Cultural Literacy. Boston, Mass.: Houghton Mifflin.

Honig, Bill, (1987). Last Chance for Our Children. Reading, Mass.: Addison-Wesley Co., Inc.

Houtz, John C. & Denmark, Robert M., (1983). Student Perceptions of Cognitive Classroom Structure and Development of Creative Thinking and Problem Solving Skills. Educational Research Quarterly, V. 8, No. 3 , 20 - 26.

Jarolimek, John, (1981). Chapter 3: Perceptions of the Functions of Schools. The School in Contemporary Society (pp.63-83). New York: Macmillan Publishing Co., Inc.

Johnson, David & Johnson, Roger T., (1988). Critical Thinking Through Structured Controversy. Educational Leadership, May, 58-64.

Johnson, David , Johnson, R.T., Holubec, E. J., & Roy, P., (1984). Circles of Learning: Cooperation in the Classroom. Alexandria, Virginia: Association for Supervision and Curriculum Development.

Kagan, Spencer, (1985) Cooperative Learning Resources for Teachers. Riverside, Ca: Printing and Reprographics, University of California, Riverside.

Kohn, Alfie, (1990). The ABC's of Caring. Teacher Magazine, January, 52-58.

Labinowitz, Ed, (1980). The Piaget Primer. Menlo Park, Ca.: Addison-Wesley Publishing Co.

Lipman, Matthew, (1988). Critical Thinking -- What Can it Be? Educational Leadership, September, 38-43.

Marzano, Robert, Brandt, R., Hughes, C., Jones, B., Presseisen, B., Rankin, S. & Suhor, C., (1988). Dimensions of Thinking: A Framework for Curriculum and Instruction, Alexandria, Virginia: Association for Supervision and Curriculum Development.

McMillan, Merna & Gentile, Lance M., (1988). Commentary: Children's Literature: Teaching Critical Thinking and Ethics. The Reading Teacher, May, 876-878.

Meade, Jeff, (1990). The Moral Life of America's Schoolchildren: An Introduction. Teacher Magazine, March, 39-41.

Paul, Richard, (1985a). Ethics Without Indoctrination. Educational Leadership. May, 1988, 10-19.

Paul, Richard, (1985b). Critical Thinking Research: A Response to Stephen Norris. Educational Leadership. 46.

Paul, Richard, (1985c). Dialectical Reasoning. In. Arthur Costa, (Ed.), Developing Minds: A Resource Book For Teaching Thinking (pp.152-160). Alexandria, Virginia: Association for Supervision and Curriculum Development.

Paul, Richard, (1988). Critical Thinking in the Classroom. Teaching K-8, April, 49-51.

Quellmalz, Edys S., (1985). Needed: Better Methods for Testing Higher Order Thinking Skills. Educational Leadership, October, 29-35.

Quellmalz, Edys S., (1987). Developing Reasoning Skills. In Joan B. Baron and Robert J Sternberg, (Eds.), Teaching Thinking Skills: Theory and Practice. (pp. 86-105). New York, N.Y.: W.H. Freeman and Co.

Strong, Richard, Silver, H., & Hanson, R., (1985). Integrating Teaching Strategies with the Elements of Effective Instruction. Educational Leadership, May, 9-15.

Strother, Deborah, (1989). Developing Thinking Skills Through Questioning. Phi Delta Kappan, December, 324-327.

Task Force on Teaching as a Profession, (1986). A Nation Prepared: Teachers for the 21st Century. p.25.

Thomas, Dene Kay, (1988). Why Questions and Why Answers: Patterns and Purposes. Language Arts, V. 65, No.6, Oct., 552-556.

Walsh, Debbie, (1988). Critical Thinking to Reduce Prejudice. Social Education, April/May, 280-282.